

Claims

1. A yarn feeding apparatus, of a weft knitting machine, for feeding a knitting yarn to a knitting fabric via a carrier that is brought by a carriage in the weft knitting machine in which a knitting fabric is knitted while moving the carriage back and forth in a longitudinal direction of a needle bed, comprising:

slack reducing means that is provided on a feeding path of the knitting yarn, whose actuation state can be controlled, and that can eliminate slack of the knitting yarn in an actuated state by pulling in the knitting yarn within a predetermined range;

excess amount calculating means for calculating an excess amount of the knitting yarn that is generated in the knitting yarn on the feeding path when a movement direction of the carriage is reversed at a knitting end of the knitting fabric, based on a signal indicating knitting data of the knitting fabric with respect to a course that is to be knitted by moving the carriage and a signal for controlling the carriage, in accordance with a distance of the path on which the knitting yarn is fed to the carrier, a distance from the carrier to the knitting fabric, and a control state of the carriage; and

control means for performing control such that slack of the knitting yarn is absorbed by actuating the slack reducing means in accordance with the excess amount that is calculated by the excess amount calculating means.

2. The yarn feeding apparatus of claim 1, further

comprising:

yarn feeding means that is provided on the feeding path of the knitting yarn, and that sends out the knitting yarn by holding the knitting yarn between a plurality of rollers including a yarn feeding roller that is rotatively driven by a servomotor;

a buffer arm that is provided on the path on which the knitting yarn is fed from the yarn feeding means to the carrier, that can be swingingly displaced around a basal end side, and that is biased by a spring such that a frontal end side through which the knitting yarn is inserted is swingingly displaced and partially pulls the knitting yarn out of the path; and

a sensor for detecting swinging displacement of the buffer arm, using as a reference an origin that is a position of the frontal end side when the knitting yarn is pulled out of the path only by the predetermined length, and for deriving a signal indicating a detection result,

wherein the control means controls the servomotor of the yarn feeding means such that the knitting yarn that becomes necessary as the knitting fabric is knitted is sent out from the yarn feeding roller, based on the signal indicating the knitting data of the knitting fabric with respect to the course that is to be knitted by moving the carriage, the signal for controlling the carriage, and the signal from the sensor.

3. The yarn feeding apparatus of claim 2, wherein the control means actuates the yarn feeding means as the slack

reducing means by performing control such that the yarn feeding roller of the yarn feeding means is rotated in a direction opposite to a direction in which the knitting yarn is sent out.

4. The yarn feeding apparatus of claim 3, wherein the path on which the knitting yarn is fed to the yarn feeding means is provided with a rewinding arm that can be swingingly displaced around a basal end side, that is biased by a spring such that a frontal end side through which the knitting yarn is inserted is swingingly displaced and partially pulls the knitting yarn out of the path, and that absorbs the knitting yarn that has been rewound to the path by rotating the yarn feeding roller in reverse.

5. The yarn feeding apparatus of claim 2, wherein:

the slack reducing means is provided on the path on which the knitting yarn is fed from the yarn feeding means to the carrier, and

the control means performs control such that the yarn feeding roller of the yarn feeding means is stopped before the slack reducing means is actuated.

6. The yarn feeding apparatus of claim 5, wherein the slack reducing means includes:

a stepping motor that is controlled by the control means, and

an arm having a basal end side mounted on a rotation axis of the stepping motor and a frontal end side through

which the knitting yarn is inserted.

7. The yarn feeding apparatus of any one of claims 2 to 6, wherein the control means:

performs PI control on the servomotor of the yarn feeding means such that swinging displacement state of the buffer arm follows a target state that is set in advance based on positional relationship between the carriage and the knitting fabric, and

changes an origin position that serves as a reference for a swinging displacement of the buffer arm when control is performed such that slack of the knitting yarn is absorbed by actuating the slack reducing means.